Energy Efficiency at Army Garrisons in the Europe Region

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Energy Efficiency at Army Garrisons in the Europe Region

Overview

Energy Consumption

Energy Efficient technologies at:

- **Building envelope**
- **HVAC Systems**
- **Lighting Systems**

Summery

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Energy Consumption

Energy Consumption at Army Garrisons in IMA Europe Region:

From 209 kWh/ a x m² in 2000 to

186 kWh / a x m² in 2005

Reduction of 23 kWh / a x m²

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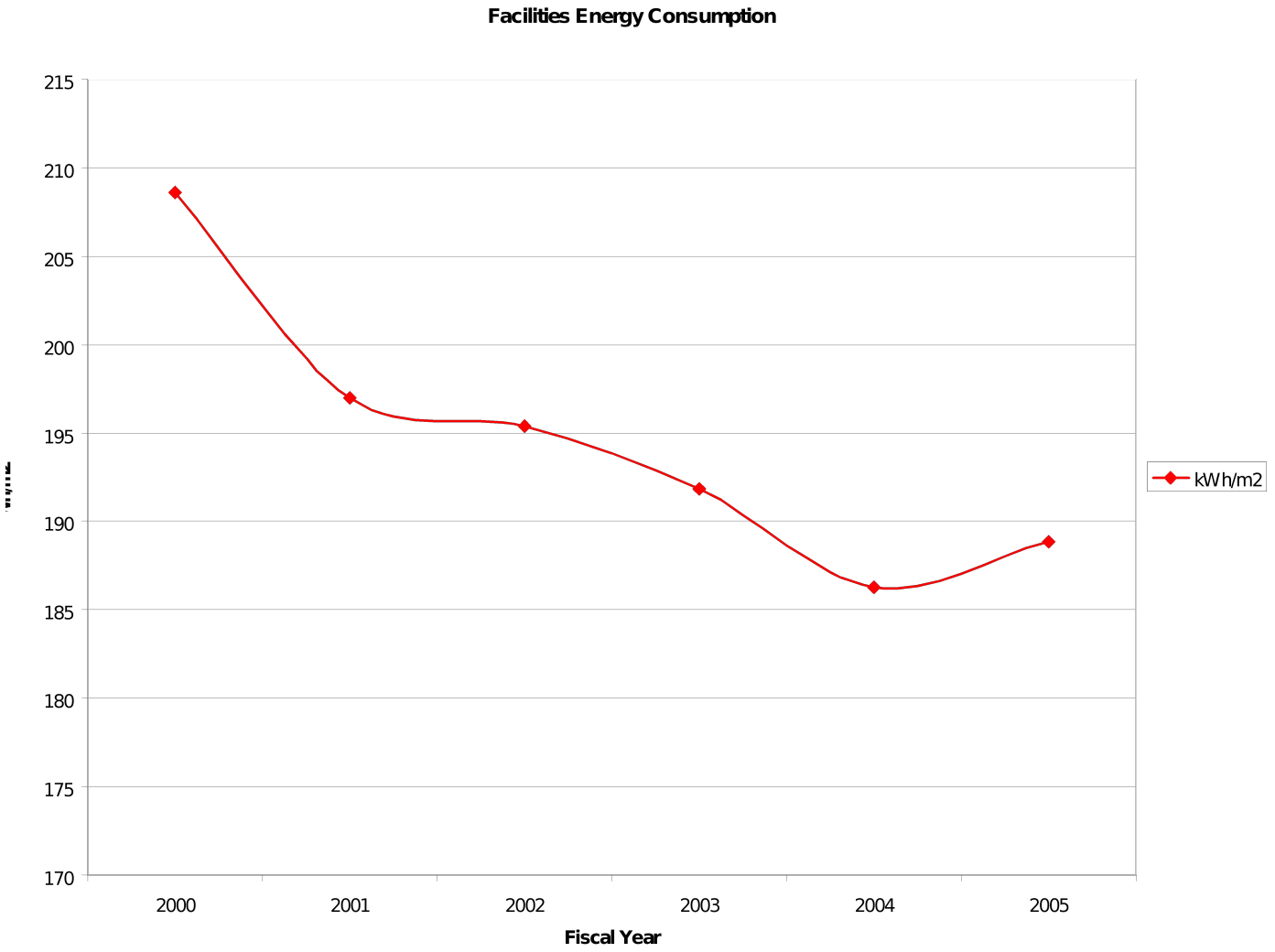

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Energy Types

used in EURO (i.e. US Garrison Bamberg)

District heat

Natural Gas

Fuel Oil

Electricity

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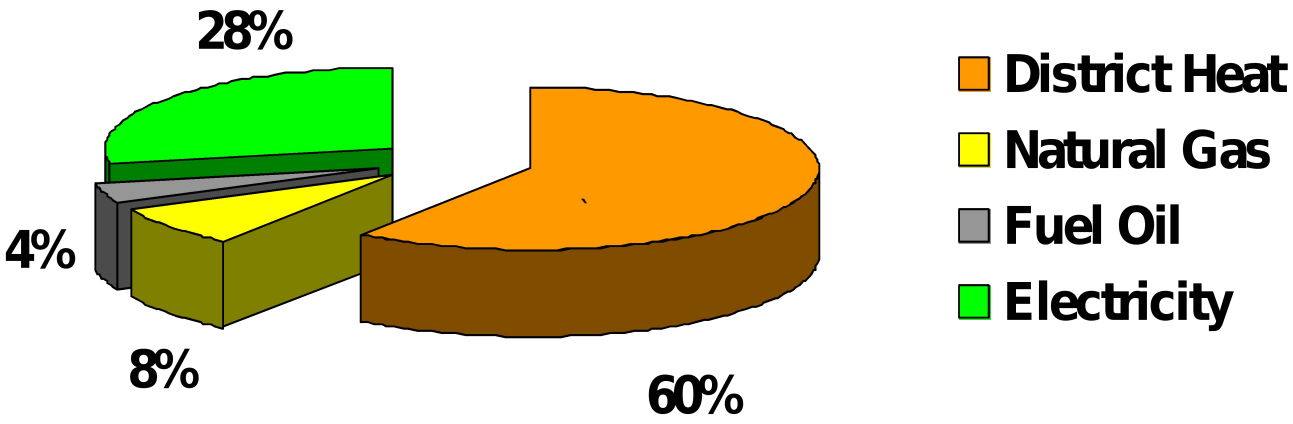
Typical Energy use in EURO (i.e. US Garrison Bamberg)



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Building Envelope

Energy Efficient technologies:

- **Insulation**
- **Shading**

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Insulation

- Roof top insulation
- Façade insulation
- Windows - double glazing

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Insulation systems

Upgrade building envelope according codes and standards

Saves up to 30% energy compared to non insulated building.

Costs about 70 Euro / m^2

Payback : 18-20 years depending on energy prices

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Insulation systems

Upgrade building envelope according codes and standards

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Roof-top insulation with deficiencies at the skylight window

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Shading

- Use of window blinds outside the window
- Roof overhang

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Shading

minimizes cooling load

lower or no AC needed

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HVAC - Systems

Energy Efficient technologies at:

- **Heating plants**
- **Heating system**
- **Air handling units**

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Heating Plants

- Boilers
- Control and Monitor System

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Heating Plant boiler

Coal fired

Annual use efficiency: 60%

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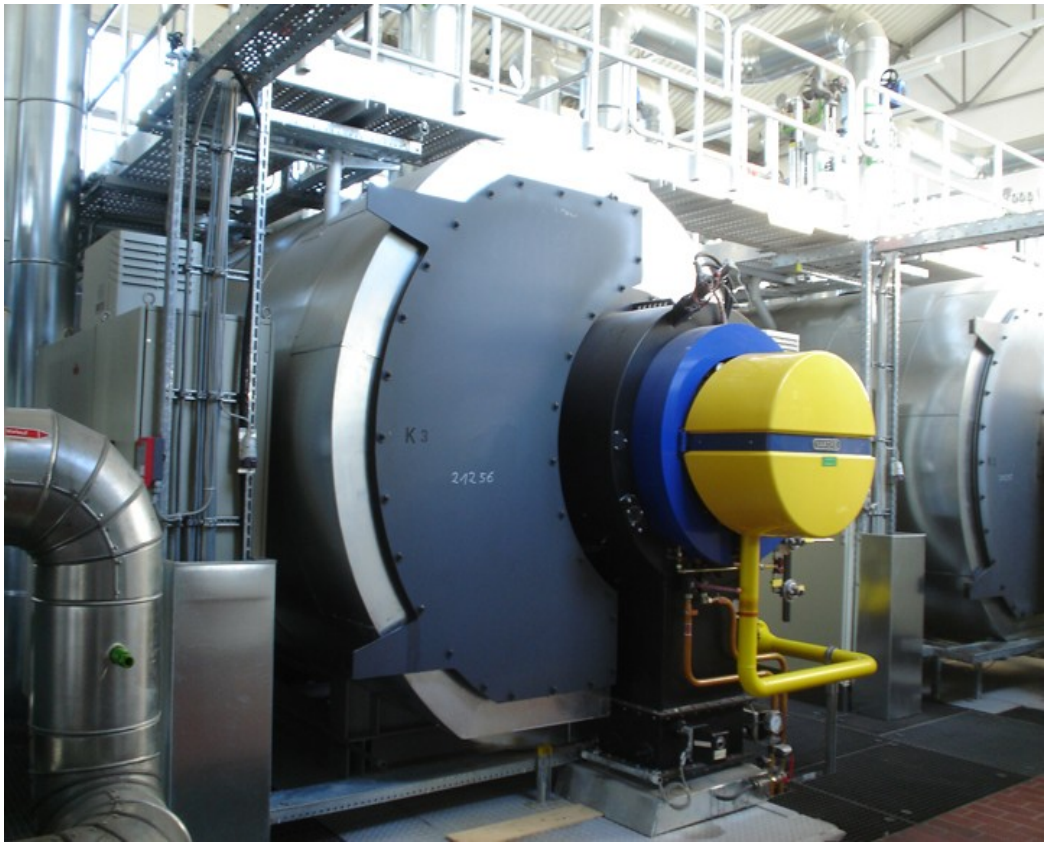

Heating plant Boiler

Natural gas fired

Annual use efficiency: 90%

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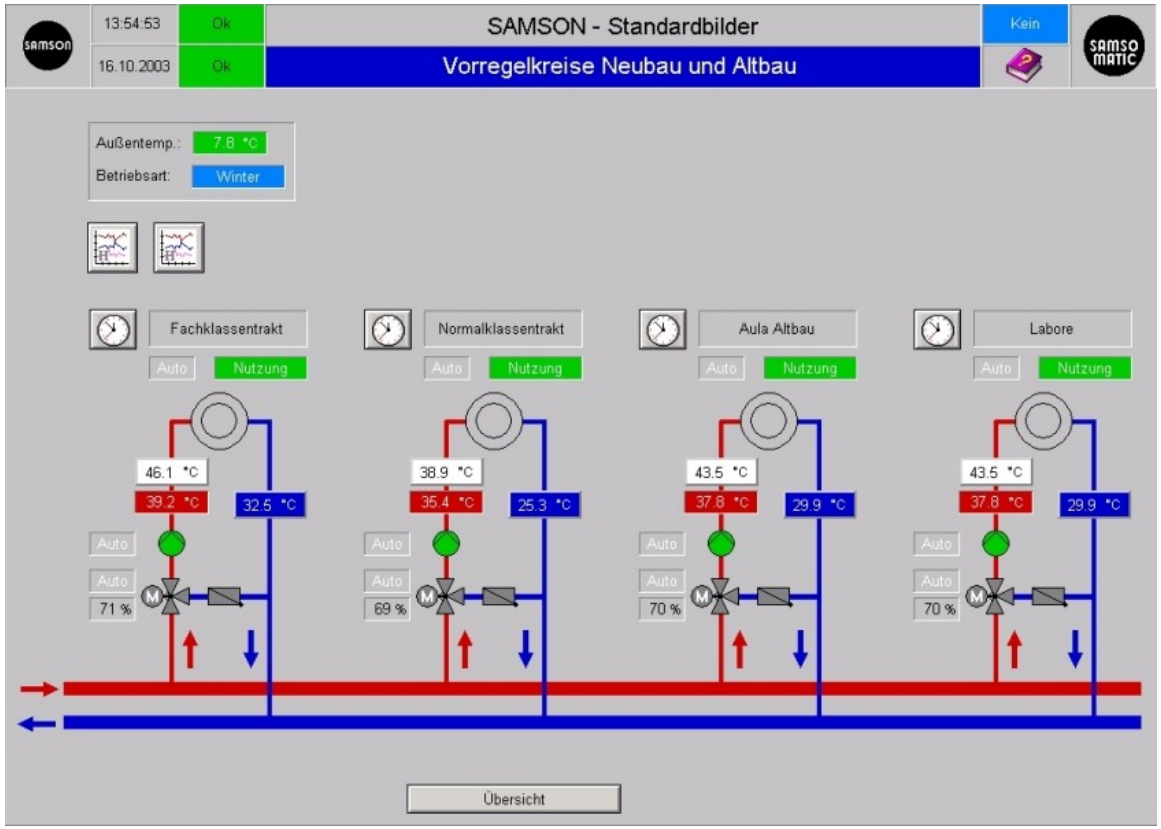

Control and Monitor System

(Screen Shot)

Savings up to 8% of total energy consumption (electricity and heating)

Payback between 7-10 years

Realized in most of

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Heating System

- Piping
- Supply Temperatures
- High efficiency pumps
- Thermal insulation of pipes

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Piping

Plastic jacket pipes system

Low maintenance costs

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Piping

Insulation deficiencies

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Supply Temperatures and flow rate

- Linked to outside temperature
- Low as possible to minimize losses
- Weak point control of flow rate

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High efficiency pumps

permanent magnet motor variable speed

Power savings:

Up to 80%, compared to a normal pump with fixed speed

Simple Pay back:

After 3 to 4 years, depending on electric rates

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<u>Thermal insulation</u> of heating and domestic hot water pipes

Thermal Pipe insulation saves up to 85% energy compared with to pipes with no insulation

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Air Handling Systems

- Heat Recovering Systems
- Demand controlled flow rate utilized by speed controlled fans

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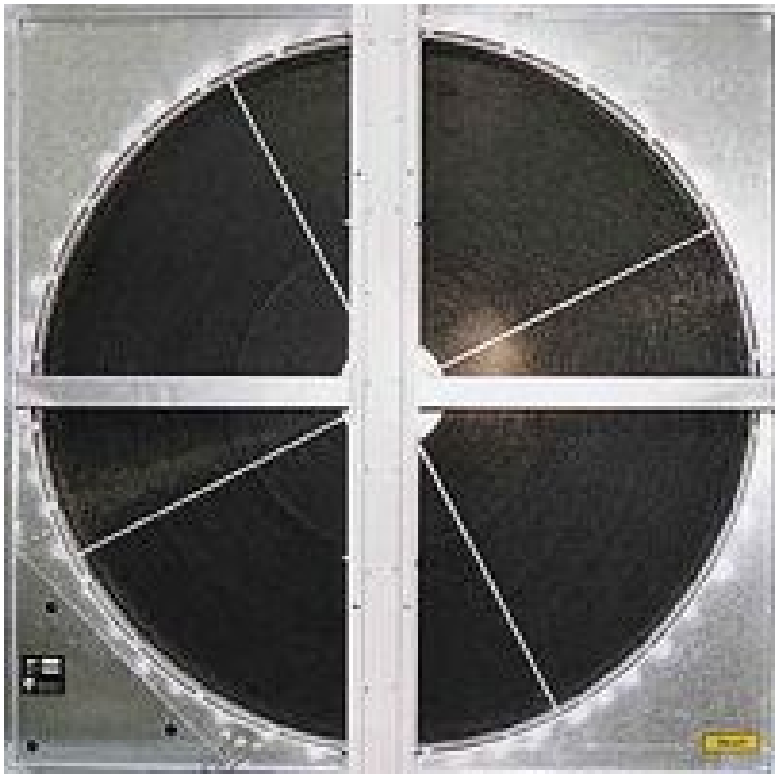

Heat wheel recovery system

with a recovery efficiency of 0,7 up to 0,8 and a high degree of controllability.

Recovering of sensitive and latent heat energy.

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Plate heat recovery system

with a recovery efficiency of 0.45 up to 0.65, completely separated airflows and high operational safety.

Low maintenance because there are no movable parts

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Direct driven fan

with backward curved blades for high pressure and economic efficiency.

High operational safety and maintenance friendly through direct drive with coupling.

Speed controlled by means of a frequency converter.

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Lighting-Systems

Energy Efficient technologies at:

- **Exterior Lighting (Street and Perimeter Fence lighting)**
- **Interior Lighting**

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Exterior Lighting

Use of:

- **Light sensors**
- **Energy efficient lights Low Pressure Sodium Lamps (yellow light)**

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Low Pressure Sodium Lamp

Saves up to 30% electricity

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Exterior Lighting

Costs for sensors :

per switch point:
250 Euro

Simple pay-back period

5 years

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Interior Lighting

Use of:

- **T5 instead of T8 lights**
- **Electronic ballasts to operate T5 lights**
- **Saves up to 25% of electricity compared with T8 lights**

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T5 lamp

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Electronic ballast for T5 lamps

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Summery

Energy efficient technologies saved:

- **Energy**

  300,000 MWh per year

- **Money**

  13.5 Million Euro per Year

- **and slow down climate change**

  70,000 t CO_2 per year